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ABSTRACT

The Mississippi Report Card (MRC) is used by the State Department of Education as a public school accountability tool. The MRC describes and characterizes school district performance and links the performance indicator profile to the accreditation level for each school district in the state. This study provided a descriptive profile of each of the state's 149 school districts for each assigned accreditation level based on indicator variables in the 1993 MRC and also determined the relationship between indicator variables and the student outcome measures. The difference between the accreditation levels computed using the MRC indicator variables and the accreditation levels assigned by the State Department of Education was studied. It was determined that about 25% of school districts placed into accreditation levels 1, 2, and 3 by the state were placed differently according to the MRC variables. It was also apparent that the MRC, in its present format, does not discriminate well when assigning school districts into accreditation levels. Only 6 of 37 indicator variables were significant discriminating variables for placing districts into accreditation levels. Recommendations are made for improvement of the MRC and accreditation placement. (Contains 15 tables and 19 references.) (SLD)

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PREDICTORS OF PUBLIC SCHOOL ACCREDITATION IN MISSISSIPPI: ANALYSIS OF THE SCHOOL REPORT CARD

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PREDICTORS OF PUBLIC SCHOOL ACCREDITATION IN MISSISSIPPI: ANALYSIS OF THE SCHOOL REPORT CARD

Introduction

Kirst (1990) reported that beginning in the 1980s school reformers introduced accountability legislation at both the national and state levels which focused on merit schools, outcome-based accreditation, interstate achievement comparisons, and state school report cards. Kirst also pointed out that accountability emerged as a major theme of the 1989 Education Summit conference where President Bush recommended reform measures such as report cards and national goals at the federal, state, and local levels of education.

Student and school indicators (variables) have become the latest focus in school reform efforts and legislative accountability mandates (Brown, 1990). Student, school, and school district indicators include a wide range of variables such as revenues, qualifications of personnel, curriculum program schedules, dropout and graduation rates. These indicators and others are now included in different public school accountability programs across the country. Brown places these school indicators into three categories: (a)

school resources, (b) management processes, and (c) student outcomes.

Odden (1990), in a study of educational indicators, argued that an indicator system is needed that provides information about educational inputs (school resources and school factors), processes (organization and instructional quality), and outputs (student outcomes and participation). Odden believes that single indicators or even large numbers of indicators, by themselves, are not sufficient to explain the complexity of the schooling process.

In Mississippi, accountability emerged as a statewide issue in 1975 when the Mississippi legislature expressed a concern about the quality of education in its school districts (Prince, 1985). The Mississippi legislature subsequently required statewide testing in grades 4, 6, and 8 and the publishing of test score results. Saterfield and Woodruff (1984) have stated that Mississippi "joined the push for quality improvements in education with the passage of the Education Reform Act (ERA) of 1982" (p. 2). The Phil Hardin Foundation (1983) has characterized the Education Reform Act of 1982 as a comprehensive strategy for the improvement of public education in Mississippi. The

Foundation noted that the ERA contained significant laws and programs established to address educational problems in four areas: (a) student achievement, (b) staff development of teachers, administrators, and other professionals, (c) local school management, and (d) school governance, leadership, and finance. Included as part of the ERA was the mandate to establish a performance-based school accreditation system that would be based on research findings on school effectiveness (Saterfield and Woodruff, 1984).

Report Cards

Pancrazio (1991) has stated that:

> State education agencies have begun to incorporate performance-based indicators within their accreditation structures or regulatory systems for public schools. In an age of wide-spread recognition for the need for educational reform, these mechanisms [indicators] were not sufficient to inform policy makers or the public on how well the reforms are working. (p. 3)

Pancrazio also reported that a national effort has been and is under way to make school report cards a major vehicle for reporting performance information to the public about schools.

The Mississippi Report Card (Mississippi State Department of Education, 1993) is used by the State

Department of Education as a public school accountability tool in Mississippi. The purpose of the Mississippi Report Card format and particular indicator variables included in the Report Card are to describe and characterize school district performance and to link the school district performance indicator profile to the accreditation level of each and every school district in the state. A school district Report Card contains a school district accreditation level rating and data in the following categories: (a) school district demographic characteristics, (b) student information, (c) teacher information, (d) special education, (e) vocational education, (f) national standardized student achievement testing, (g) state student achievement testing, (h) financial information, (i) Chapter 1, and (j) gifted education.

Problem Statement

Odden (1990), in studies of state report cards, has noted that strategies are needed to insure educational indicator systems include variables that provide information or data that is valid and useful for making policy decisions:

> Monitoring outcomes alone does not provide enough information to determine why changes in outcomes occur over time. Unless the indicator systems that are developed and used provide information far beyond outcome measures, we will be unable to say why achievement trends rise, fall, and plateau. We will be unable to make sound suggestions for new policies to shift trends into desired directions. (p. 24)

Pancrazio (1991) has made the point that simply reporting indicator variables is not sufficient to inform policy makers or the public on how well educational reforms are working. Bobbett, French, & Achilles (1994) have argued recently that report cards "can have little impact on educational improvement if consumers cannot find direction for improvement efforts" (p. 33). Hayden (1994) has noted that, although the Mississippi Report Card lists per pupil expenditure as one indicator variable, it is not clear what it means in isolation and unrelated to other indicator variables. She states that each school district's per pupil expenditure "includes all money coming in for operating costs. That can make for a great mix" (p. 18A). In other words, some districts have large transportation expenditures included in their per pupil expenditure variable while others do not. The correct and accurate interpretation of indicator variables and an understanding of their

relationship to each other are important to law makers in Mississippi. The Mississippi Report Card does not explain what relationships the indicator variables have to each other, what relationships the indicator variables have to student academic achievement, and what relationships the indicator variables have to accreditation levels.

To date, there have been no empirical studies that (a) provide a descriptive profile, based on the indicator variables, of the 149 Mississippi school districts receiving the Report Card, (b) determine the relationship between the indicator variables and accreditation outcome measures reported in the Report Card, and (c) determine if school district accreditation levels computed using the Report Card indicator variables differ from the school district accreditation levels assigned by the Mississippi State Department of Education.

Theoretical Implications of the Study

Theoretical structure and basis of the Mississippi Report Card (Mississippi State Department of Education, 1993) and school district accreditation process is contained in two documents: Senate Bill No. 3350 in the Mississippi Code of 1972 (1972 & Supp. 1994) and The Requirements of the

Commission on School Accreditation: Policies, Procedures, and Standards, (Mississippi State Department of Education, 1994d). Development of the Report Card and the school district accreditation rating procedure were driven by proposals presented by the Mississippi legislature and the State Department of Education. Senate Bill No. 3350 in the Mississippi Code of 1972 (1972 & Supp. 1994) states:

> Beginning with the 1993-1994 school year and each school year thereafter, the State Board of Education, acting through the Office of Educational Accountability, shall develop a public school reporting system, or 'Mississippi Report Card,' on the performance of students and schools at the local, district and state level. In developing said report card, the Office of Educational Accountability shall collect . . . student achievement data . . . and compare such data with national standards . . . . The Mississippi Report Card shall provide more than reports to parents on the level at which their children are performing; said report shall provide clear and comparable public information on the level at which schools, school districts and the state public education system are performing. (pp. 24-25)

The second document that called for measures to determine school district accreditation was the State Department of Education Bulletin 171 (Mississippi State Department of Education, 1994d) which states that: "In accordance with State Board Policy, the Commission [on school accreditation] will determine the annual

accreditation level of a school district based on its degree of compliance with both process and performance standards" (p. 16). These two proposals were intended to provide a picture of relative school district performance and relative school district accreditation status using the Report Card as the primary reporting mechanism. These documents provide the implied theoretical structure and basis for development of the Report Card and accreditation ratings for Mississippi school districts. The implied theory of accreditation embodied in Senate Bill No. 3350 in the Mississippi Code of 1972, (1972 & Supp. 1994) and SDE Bulletin 171 (Mississippi State Department of Education, 1994d) presumes that the indicator variables describing school districts are related to and are used to assign accreditation ratings (levels) to school districts. Accurate interpretation of the information in the Report Card by the public, educators, and policy makers is an important consideration when comparing school districts across accreditation levels based on the indicator variables presented in the Report Card. However, this implied theory of accreditation, which links Report Card indicator variables to accreditation levels, has not yet been empirically examined, tested or determined. Thus, there

is a need to systematically examine the relationship between the Report Card indicator variables, the relationship between the indicator variables and accreditation outcome measures, and the relationship between indicator variables and school district accreditation levels presented in the Mississippi Report Card.

Purpose of the Study

The purpose of this study was to: (a) provide a descriptive profile of the 149 Mississippi school districts for each assigned accreditation level based on the indicator variables in the 1993 Mississippi Report Card, (b) determine the relationship between the indicator variables and the student outcome measures in the Report Card, and (c) determine if school district accreditation levels computed using the Report Card indicator variables differ from the school district accreditation levels assigned by the Mississippi State Department of Education.

This study empirically examined and tested, both directly and indirectly, theoretical validity of Mississippi's implied theory of school district accreditation that is embodied in the Report Card approach

to accountability. It is also possible, depending upon the findings, that the study could form the basis for some theoretical rethinking and reformulation of theory underlying the development of the Report Card.

Research Objectives

1. Provide a descriptive profile of Mississippi's 149 school districts based on the indicator variables reported in the Mississippi Report Card.

2. Determine the relationships between the indicator variables and the accreditation outcome measures for the 149 school districts reported in the Mississippi Report Card.

3. Determine the difference in computed school district accreditation levels based on indicator variables in the Mississippi Report Card and the accreditation levels assigned to school districts by the Mississippi State Department of Education?

Educational Significance of the Study

This study provided a systematic view of variables in the Report Card and their relationship to student achievement and accreditation levels. This study also indirectly tested the implied theory of accreditation found

in Mississippi Senate Bill No. 3350 in the Mississippi Code of 1972 (1972 & Supp. 1994) and the State Department of Education Bulletin 171 (Mississippi State Department of Education, 1994d). The findings from this study provided the public, educators, and policy makers with information about interactions of indicator variables and their relationship to school district accreditation.

Methods

Population and Instrumentation

The population in this study consisted of all 149 public school districts in Mississippi. Data for this study on school district indicator variables and accreditation levels were obtained from school district Mississippi Report Cards (Mississippi State Department of Education, 1993). Report Card data were obtained from the Mississippi State Department of Education and was in electronic format on 3.5 inch computer diskettes. Additional data were collected directly from the Annual Report of the State Superintendent of Public Education (Mississippi State Department of Education, 1994a), and the Public School Enrollment 1993-94

End of First Month (Mississippi State Department of Education, 1994c). Data from the Financial Accounting Manual for Mississippi Public School Districts (Mississippi State Department of Education, 1994b) were obtained from the State Department of Education on 3.5 inch diskettes. For this study, data in the Mississippi Report Card (Mississippi State Department of Education, 1993) were placed in one of three categories. These three categories were: (a) student and school district characteristics (b) financial factors, and (c) accreditation outcome measures. The statistical analysis for the research objectives were conducted at the .05 level of statistical significance.

Data Analysis

Several procedures were required to address the research objectives in this study. These procedures were as follows:

Research Objective 1. Provide a descriptive profile of Mississippi's 149 school districts based on the indicator variables reported in the Mississippi Report Card?

Procedure: Means, standard deviations, and frequencies for all 149 Mississippi school districts were calculated on indicator variables in the Mississippi Report Card to provide a systematic view (descriptive profile) of the school districts in the 1993 Mississippi Report Card. The selected indicator variable means were placed in the following categories: student and school district characteristics, financial factors, and accreditation outcome measures. This analysis provided the researcher with an overall description (picture) of school districts based on indicator variables presented in the Report Card.

Research Objective 2. Determine the relationships between the indicator variables and the accreditation outcome measures for the 149 school districts reported in the Mississippi Report Card?

Procedure: Regression analyses were used to determine which of the indicator variables presented in the Report Card are the best predictors of accreditation outcome measures for all the school districts. This procedure used indicator variables in the student and school district characteristics and financial factors categories as independent variables and accreditation outcome measures as dependent variables. The use of regression analysis to address this research objective allowed the researcher to determine if the variables presented in the Report Card were significant predictors of accreditation outcome measures. One or more percent of variation associated with a predictor variable was considered significant.

Research Objective 3. Determine the difference in computed school district accreditation levels based on indicator variables in the Mississippi Report Card and the accreditation levels assigned to school districts by the Mississippi State Department of Education?

Procedure: The final step in this research process was to use discriminant function analysis to verify which accreditation levels the school districts were sorted into based on Report Card indicator variables in the following

categories: school district characteristics, financial factors, and accreditation outcome measures. Norusis (1993b) indicates discriminant function analyses "compute 'discriminant scores' for each case to predict what group it is in" (p. 414). Linear combinations of the independent variables are obtained by using these scores. This computation results in the best separation of the groups and indicates the most accurate prediction of the group for each case based on the values of the independent variables (Hair, Anderson, Tatham, & Black, 1992).

Results and Discussion

All indicator variables in the Report Card were district level data. No individual student data or individual school data were presented in this study.

Research Objective 1

For research objective 1, the explore procedure was appropriate since it produced summary statistics of variables for all 149 school districts combined and for school districts within the separate accreditation levels. The explore procedure produces a 5% trimmed mean in the analysis. This procedure disregards the smallest 5% and the

largest 5% of all observations and subsequently bases the calculation of mean values on the middle 90% of the observations. According to Norusis (1993a), the advantage of the trimmed mean is that it results in an estimate that is not influenced by extreme values in the upper and lower 5% of the observations. Therefore, the trimmed mean is a more accurate estimate of central tendency for the distributions of the indicator variables.

Summary of Findings Associated With Research Objective 1

Student and School Indicator Variables

Regarding student and school indicators, the findings indicated that school districts in accreditation level 3 had higher total populations, higher white percentages of the population, higher percentages of the population with high school diplomas, and higher per capita incomes than the school districts assigned to accreditation levels 1 and 2. Also, for the school districts in accreditation level 3, the findings indicated higher student enrollments, number of Carnegie units taught, and number of teachers with advanced degrees than for the school districts in accreditation

levels 1 and 2. Higher black percentages of the population, more emergency certificates as a percentage of the number of teachers, more percentage of the students eligible for free lunch, and higher percentage of families below the poverty level were characteristic of school districts assigned to accreditation levels 1 and 2 as compared to school districts in other accreditation levels. Classroom pupil/teacher ratios were comparable across all accreditation levels, while graduation rates were comparable for school districts in accreditation levels 1, 2, and 3. On the other hand, graduation rates were higher for school districts in accreditation level 5 when compared to graduation rates in school districts with accreditation level ratings of 1, 2, and 3. Table 1 presents a comparison of 5% trim means of school districts in each of the four accreditation levels to the combined mean of all 149 school districts. The n represents the number of school districts in each accreditation level.

Table 1

Summary Matrix of the 5% Trim Mean of Each Student and School Indicator Variable Compared to the Combined Mean

Indicator	Accreditation Levels 1	2	3	5
(n)	14	34	99	2
Total Population	-	+	+	+
Percentage of White Total Population	-	-	+	+
Percentage of Black Total Population	+	+	-	-
Percentage of Total Population With a High School Diploma	-	-	+	+
Percentage of Total Population With 4/+ Years of College	-	-	0	+
Per Capita Income	-	-	+	+
Percentage of Families Below Poverty Level	+	+	-	-
Student Enrollment	-	-	+	+
Attendance As a Percentage of Enrollment	0	0	+	0
Percentage of Students Eligible for Free Lunch	+	+	-	-
Number of Carnegie Units	-	-	+	+
Classroom Pupil/Teacher Ratio	0	0	0	+
Graduation Rate	0	-	0	+
Percentage of Teachers With Advanced Degrees	-	+	0	+
Emergency Certificates As a Percentage of Total Number of Teachers	+	0	-	0

Note. Minus (-) represents values below the combined mean value, plus (+) represents values above the combined mean value, and zero (0) represents values the same as the combined mean value.

Financial Indicator Variables

When financial indicator variables were used to describe school districts, school districts in accreditation levels 3 and 5 had larger per pupil expenditures, larger assessed valuations per pupil, larger per pupil expenditures for instruction excluding Chapter 1 funds, and larger per pupil revenues for extracurricular student activities than school districts in accreditation levels 1 and 2. School districts assigned to accreditation levels 1 and 2 had larger percentage of expenditures for district administration and larger per pupil expenditures for instruction than school districts assigned to accreditation levels 3 and 5. Table 2 presents a comparison of 5% trim means of school districts in each of the four accreditation levels to the combined mean of all 149 school districts. The n represents the number of school districts in each accreditation level.

Table 2

Summary Matrix of the 5% Trim Mean of Financial Indicator Variables Compared to the Combined Mean

Indicator	Accreditation Levels 1	2	3	5
(n)	14	34	99	2
Per Pupil Expenditure . . .	+	+	-	-
Percentage Expenditure for District Administration .	+	+	0	-
Assessed Valuation Per Pupil	-	+	+	+
Per Pupil Expenditure for Instruction	+	+	-	+
Per Pupil Expenditure for Instruction Excluding Chapter 1 Funds	-	-	+	+
Per Pupil Revenues for Extracurricular Student Activities	-	-	+	+
Per Pupil Expenditures for Extracurricular Student Activities	-	-	0	+

Accreditation Outcome Measures

Finally, with regard to accreditation outcome measures, the findings of the descriptive analysis indicated that school districts in accreditation levels 3 and 5 had higher mean test score values than the school districts assigned to accreditation levels 1 and 2. Table 3 presents a comparison of 5% trim means of school districts in each of the four

accreditation levels to the combined mean of all 149 school districts.

Table 3

Summary Matrix of the 5% Trim Mean of Accreditation Outcome Measures Compared to the Combined Mean

Indicator	Accreditation Levels 1	2	3	5
(n)	14	34	99	2
State Algebra I Test Score	-	-	+	+
Functional Literacy Exam Score for Reading	-	-	+	+
Functional Literacy Exam Score for Mathematics	-	-	+	+
Functional Literacy Exam Score for Writing	-	-	+	+
Stanford Achievement Test Grade 4 Reading Score	-	-	+	+
Stanford Achievement Test Grade 4 Language Score	-	-	+	+
Stanford Achievement Test Grade 4 Mathematics Score	-	-	+	+
Stanford Achievement Test Grade 6 Reading Score	-	-	+	+
Stanford Achievement Test Grade 6 Language Score	-	-	+	+
Stanford Achievement Test Grade 6 Mathematics Score	-	-	+	+
Stanford Achievement Test Grade 8 Reading Score	-	-	+	+
Stanford Achievement Test Grade 8 Language Score	-	-	+	+
Stanford Achievement Test Grade 8 Mathematics Score	-	-	+	+

Research Objective 2

Stepwise multiple linear regression analyses were performed to determine which indicator variables presented in the Mississippi Report Card (Mississippi State Department of Education, 1993) accounted for a statistically significant amount of variation in accreditation outcome measures. All regression analyses were performed using the stepwise method of selecting the predictor variables in this section of the analysis. The regression analysis estimates the coefficients of a linear equation involving the independent variables that best predict the value of the dependent variable. Multiple regression determines the relative importance of each independent variable on the accreditation outcome measure used in the analysis. Indicator variables that were used as independent variables (predictor variables) for regression analysis were student and school indicator variables and financial indicator variables. The dependent variables used in the analysis were accreditation outcome measures variables. They were the: (a) Functional Literacy Exam composite score, (b) Stanford Achievement Test composite score, and (c) the state Algebra I Test score. One way to determine or assess the relative

importance of independent variables in the regression equation is to consider the increase in the R^2 value when a variable is entered into the regression equation that already contains the other independent variables (Pedhauzer, 1982). The R^2 increase can be calculated by subtracting the previous R^2 reported at each step from the R^2 in subsequent steps. The equation used in this analysis was

$$R^2_{change} = R^2 - R^2_{(i)}$$

where $R^2_{(i)}$ is the R^2 value when all independent variables except the ith variable were in the equation. All multiple regression analyses were performed at the .05 level of statistical significance.

Summary: Student and School Indicators

Functional Literacy Scores

The discussion of the multiple regression analyses using student and school indicator variables that accounted for some variation in accreditation outcome measures is summarized in this section. The indicators that explained 41.3% of the variation in the Functional Literacy Exam (FLE) composite mean scores for all school districts combined were percentage of families the below poverty level, classroom

pupil/teacher ratios, and the graduation rate. An increase in FLE composite scores was predicted by a decrease in the percentage of families below the poverty level and an increase in classroom pupil/teacher ratio and graduation rate.

For school districts in accreditation level 1, percentage of the population with high school diplomas accounted for 35.2% of the variation in the FLE composite scores.

Classroom pupil/teacher ratio and graduation rate accounted for 62.5% of the variation in FLE composite scores for school districts in accreditation level 2.

Three indicators accounted for 31.9% of the variation in FLE composite scores for accreditation level 3. These variables were percentage of the students eligible for free lunch, number of Carnegie units taught, and percentage of the teachers with advanced degrees. A decrease in percentage of the students eligible for free lunch and number of Carnegie units taught were associated with an increase in FLE composite scores. Table 4 presents the summary of multiple regression analysis using student and school indicators as the independent variables and Functional

Literacy Exam scores as the dependent variable.

Table 4

Stepwise Multiple Regression Analysis for Variables in the Student and School Indicator Category Predicting Functional Literacy Exam Composite Scores

Variables in the Equation			
Variable	Beta	t	prob.
A. All 149 School Districts Combined			
Percent families below poverty level	-.244	-3.759	.000*
Classroom pupil/teacher ratio	.243	3.770	.000*
Graduation rate	.465	7.155	.000*
B. Accreditation Level 1			
Percent with high school diploma	.593	2.554	.025*
C. Accreditation Level 2			
Classroom pupil/teacher ratio	.358	3.105	.004*
Graduation rate	.603	5.227	.000*
D. Accreditation Level 3			
Percent students eligible for free lunch	-.507	-5.727	.000*
Number of Carnegie units taught	-.252	-2.886	.005*
Percent of teachers with advanced degrees	.180	2.089	.039*

*$p < .05$

SAT Scores

Approximately 53% of the variation in SAT scores for all school districts combined was accounted for by variations in percentage of families below the poverty level and percentage of the students eligible for free lunch. Specifically, higher the SAT composite scores tended to be associated with districts having a lower percentage of the students eligible for free lunch and a lower percentage of families below the poverty level.

For school districts in accreditation level 1, emergency certificates as a percentage of the total number of teachers accounted for 34.1% of the variation in SAT composite scores with high SAT composite scores associated with lower emergency certificates as a percentage of the number of teachers.

High attendance as a percentage of enrollment was associated with high SAT composite scores for school districts in accreditation level 2.

In accreditation level 3, variations in per capita income, percentage of families below the poverty level, percentage of the students eligible for free lunch, the number of Carnegie units taught, and the graduation rate

considered collectively accounted for 49.2% of the variation in SAT composite scores. Higher SAT composite scores were associated with higher per capita income, lower percentage of families below the poverty level, lower percentage of the students eligible for free lunch, and higher graduation rates.

For all school districts combined, percentage of the students eligible for free lunch and graduation rates accounted for 40.9% of the variation in Algebra I scores with higher graduation rates and low percentage of the students eligible for free lunch predicting higher SAT composite scores. Table 5 presents the summary of multiple regression analysis using student and school indicators as the independent variables and Stanford Achievement Test scores as the dependent variable.

Table 5

Stepwise Multiple Regression Analysis for Variables in the Student and School Indicator Category Predicting SAT Composite Scores

Variables in the Equation			
Variable	Beta	t	prob.
A. All 149 School Districts Combined			
Percent families below poverty level	.514	4.297	.000*
Percent students eligible for free lunch	-1.139	-9.529	.000*
B. Accreditation Level 1			
Emergency certificates as a percent of total number of teachers	-.584	-2.492	.028*
C. Accreditation Level 2			
Attendance as percent of enrollment	.356	2.156	.039*
D. Accreditation Level 3			
Per capita income	.216	2.118	.037*
Percent families below poverty level	.569	3.962	.000*
Percent students eligible for free lunch	-.949	-6.875	.000*
Number of Carnegie units taught	-.223	-2.729	.008*
Graduation rate	.167	2.195	.031*

*$p < .05$

State Algebra I Scores

For school districts in accreditation level 1, approximately 90% of the variation in Algebra I scores was accounted for by percentage of the population with a high school diploma, the number of Carnegie units taught, and classroom pupil/teacher ratio. Higher percentages of the population with high school diplomas and higher number of Carnegie units taught were associated with higher Algebra I scores. Lower classroom pupil/teacher ratios were associated with higher Algebra I scores.

For school districts in accreditation level 2, graduation rate was the predictor variable that accounted for 13.8% of the variation in Algebra I scores.

For the accreditation level 3 school districts, the percentage of the students eligible for free lunch was the only significant predictor of Algebra I scores. It was found to predict 15.9% of the variation in Algebra I scores. In particular, low percentages of the students eligible for free lunch were associated with higher Algebra I scores. Table 6 presents the summary of multiple regression analysis using student and school indicators as the independent

variables and state Algebra I test scores as the dependent variable.

Table 6

Stepwise Multiple Regression Analysis for Variables in the Student and School Indicator Category Predicting State Algebra I Scores

Variables in the Equation			
Variable	Beta	t	prob.
A. All 149 School Districts Combined			
Percent students eligible for free lunch	-.649	-10.018	.000*
Graduation rate	.152	-2.337	.021*
B. Accreditation Level 1			
Percent with high school diploma	.565	3.700	.004*
Number of Carnegie units taught	.357	2.345	.041*
Classroom pupil/teacher ratio	-.570	-5.565	.000*
C. Accreditation Level 2			
Graduation rate	.372	-2.265	.030*
D. Accreditation Level 3			
Percent students eligible for free lunch	-.399	-4.288	.000*

*$p < .05$

Summary: Financial Indicators

Functional Literacy Exam Scores

The discussion of the multiple regression analyses using financial indicator variables as independent variables and accreditation outcome measures as dependent variables is summarized in this section. First, Functional Literacy Exam composite mean scores were used as the dependent variable. For all school districts combined and for school districts in accreditation level 2, per pupil expenditure for instruction and per pupil expenditure for instruction excluding Chapter 1 funds, taken collectively, accounted for 33.9% and 56.1% of the variation FLE composite scores, respectively. Higher FLE composite scores were predicted by lower per pupil expenditures for all instruction and higher per pupil expenditures for instruction excluding Chapter 1 funds.

Per pupil expenditures and per pupil expenditures for instruction excluding Chapter 1 funds accounted for variation in FLE scores for school districts in accreditation level 1 (51.4%) and level 3 (11.7%). For the accreditation levels 1 and 3, higher FLE composite scores

were found to be associated with lower per pupil expenditures and higher per pupil expenditures excluding Chapter 1 funds. Table 7 presents the summary of multiple regression analysis using financial indicators as the independent variables and Functional Literacy Exam composite scores as the dependent variable.

Table 7

Stepwise Multiple Regression Analysis for Variables in the Financial Indicator Category Predicting Functional Literacy Exam Composite Scores

Variables in the Equation			
Variable	Beta	t	prob.
A. All 149 School Districts Combined\Accreditation Level 2			
Average per pupil expenditure for instruction	-.831	-8.541	.000*
Average per pupil expenditure for instruction excluding Chapter 1 funds	.618	6.351	.000*
B. Accreditation Level 1 and Level 3			
Per pupil expenditure	-.643	-2.989	.012*
Average per pupil expenditure for instruction excluding Chapter 1 funds	.481	2.235	.047*

*$p < .05$

SAT Scores

Stanford Achievement Test (SAT) composite mean scores were used as the dependent variable in a second multiple regression analyses where the seven financial indicator variables were used as predictor variables. For all school districts combined, per pupil expenditures and per pupil expenditures for instruction excluding Chapter 1 funds accounted for 24.6% of the variation in the SAT composite scores. Lower total per pupil expenditures and higher per pupil expenditures for instruction excluding Chapter 1 funds predicted higher SAT scores. There were no statistically significant financial indicator predictors of SAT composite scores for school districts in accreditation levels 1, 2, and 3. Table 8 presents the summary of multiple regression analysis using financial indicators as the independent variables and Stanford Achievement Test composite scores as the dependent variable.

Table 8

Stepwise Multiple Regression Analysis for Variables in the Financial Indicator Category Predicting SAT Composite Scores for All 149 School Districts Combined

Variables in the Equation			
Variable	Beta	t	prob.
Per pupil expenditure	-.397	-4.202	.000*
Average per pupil expenditure for instruction excluding Chapter 1 funds	.394	4.921	.000*

*$p < .05$

State Algebra I Scores

Finally, state Algebra I mean scores were used as a third dependent variable in the multiple regression analyses with financial indicators as the predictor variables. Assessed valuation per pupil, per pupil expenditures, percentage expenditures for district administration, and per pupil expenditures for instruction excluding Chapter 1 funds accounted for 27.8% of the variation in Algebra I scores for all school districts combined. More specifically, higher Algebra I scores were associated with higher assessed valuation per pupil and higher per pupil expenditures excluding Chapter 1 funds. Lower per pupil expenditures and

lower percentage of expenditures for district administration were associated with higher Algebra I scores.

For accreditation level 1 school districts, per pupil expenditures for instruction excluding Chapter 1 funds accounted for 63.8% of the variation in Algebra I scores. In particular, higher per pupil expenditures for instruction excluding Chapter 1 funds accounted for higher Algebra I scores.

On the other hand, for accreditation level 2 and 3 school districts, there were no financial indicators that accounted for variation in Algebra I scores. Table 9 presents the summary of multiple regression analysis using financial indicators as the independent variables and state Algebra I test scores as the dependent variable.

Table 9

Stepwise Multiple Regression Analysis for Variables in the Financial Indicator Category Predicting State Algebra I Composite Scores

Variables in the Equation			
Variable	Beta	t	prob.
A. All 149 School Districts Combined			
Assessed valuation per pupil	.167	2.105	.037*
Per pupil expenditure	-.397	-4.202	.000*
Percent of expenditure for district administration	-.161	-1.929	.049*
Average per pupil expenditure for instruction excluding Chapter 1 funds	.394	4.921	.000*
B. Accreditation Level 1			
Per pupil expenditure for instruction excluding Chapter 1 funds	.798	4.594	.001*

*$p < .05$

Research Objective 3

Research objective 3 was to determine the difference was in computed school district accreditation levels based on indicator variables in the Mississippi Report Card and the accreditation levels assigned to school districts by the Mississippi State Department of Education. For research

objective 3, multiple discriminant function analysis was applied to the indicator variables in each of three categories to determine if the indicator variables could make up a discriminant function that would differentiate among four levels of school district accreditation level ratings and if the function could classify the four accreditation levels different from the levels assigned by the State Department of Education. The three categories of indicator variables were: (a) student and school indicators, (b) financial indicators, and (c) accreditation outcome measures. For purposes of brevity and clarity, the multivariate discriminant function analysis was referred to as discriminant analysis in the remainder of this chapter. The discriminant analysis procedure determines the linear combination of predictor variables that best classify cases into one of several known groups (Hair, Anderson, Tatham & Black, 1992). Discriminant analysis is an analytical predictive technique that establishes procedures for classifying statistical units into groups on the basis of their scores on several independent variables simultaneously (Pedhauzer, 1982). In addition, discriminant analysis determines which of the independent variables account most

for the differences in the average score profiles of the groups. Eigenvalues, canonical correlations, and Wilks' Lambda analyses are considered robust to heterogeneity of covariance matrices, different sample sizes, and the different number of variables in the use of discriminant analysis. Pedhauzer has recommended that structure coefficients be used as indices of the relative importance of discriminating variables rather than standardized coefficients due to the interrelatedness among the variables.

Discriminant analysis was appropriate for addressing research objective 3 to determine if accreditation levels of school districts determined by analyzing indicator variables in the Mississippi Report Card (Mississippi State Department of Education, 1993) would differ from school district accreditation levels assigned by the Mississippi State Department of Education. Indicator variables in the Mississippi Report Card, which were the independent or predictor variables, were analyzed by discriminant analysis for school districts within each of the four accreditation levels assigned by the State Department of Education. The dependent or grouping variable was accreditation level. For

this discriminant analysis, measures from all 149 school districts in the Mississippi Report Card were used.

Summary: Student and School Indicators

Discriminant analysis was used to determine which student and school indicators were important predictor variables for classifying school districts into one of four accreditation levels. The school districts placed in the accreditation levels determined by discriminant analysis were then compared to the school districts in the accreditation levels assigned by the state Department of Education. The percentage of the students eligible for free lunch was the one discriminating variable that was defined by the discriminant analysis to classify school districts within one of four accreditation levels.

Table 10 shows percentage of the students eligible for free lunch as the discriminating variable that defined the discriminant function. The Wilks' Lambda value was selected as the criterion for indicator selection using the stepwise method. Percentage of the students eligible for free lunch was the indicator variable with the highest value to be selected in the equation. This indicator variable had the

highest correlation with the discriminant function. No other indicator variables met the criterion for selection.

Table 10

Stepwise Discriminant Analysis for Accreditation Levels: Wilks' Lambda of Student and School Indicator Variables

Step	Variable entered	Wilks' Lambda	prob.
1	Free lunch	.491	.000*

*$p < .05$

All 149 school districts were classified in either accreditation level 2 or level 3 by discriminant analysis as compared to all 149 districts being assigned to one of four accreditation levels by the State Department of Education. Based on the discriminant analysis of the 16 student and school indicators, 33 (22%) of the 149 school districts were assigned to accreditation levels differently than was assigned by the State Department of Education.

The results of the computer analysis, based on the student and school indicator variables, indicated that approximately 22% (n=33) of the school districts were assigned (using the discriminant analysis) accreditation

levels different from accreditation levels awarded by the State Department of Education (see Table 11).

Table 11

Stepwise Discriminant Analysis: Classification Results of Accreditation Levels Using Variables in the Student and School Indicators Category

		Predicted level membership and percent			
Assigned level	n	1	2	3	5[a]
1	14	0 0.0%	11 78.6%	3 21.4%	0 0.0%
2	34	0 0.0%	26 76.5%	8 23.5%	0 0.0%
3	99	0 0.0%	9 9.1%	90 90.9%	0 0.0%
5[a]	2	0 0.0%	0 0.0%	2 100.0%	0 0.0%

[a]No accreditation level 4 was assigned to any school district in the 1993 Mississippi Report Card.

Summary: Financial Indicators

Discriminant analysis was used to determine which financial indicators were important predictor variables used to classify school districts into one of four accreditation levels. The discriminating variables that were defined by

the discriminant analysis to classify school districts within one of four accreditation levels were percentage expenditure for district administration, per pupil expenditures for instruction excluding Chapter 1 funds, and per pupil expenditures (see Table 12).

Table 12

Stepwise Discriminant Analysis for Accreditation Levels: Wilks' Lambda of Financial Indicator Variables

Step	Variables in the equation Variable entered	Wilks' Lambda	prob.
1	Percent expenditure for district administration . .	.857	.000*
2	Per pupil expenditure for instruction without Chapter 1 funds .	.759	.000*
3	Per pupil expenditure for instruction . . .	.611	.000*

*$p < .05$

All the school districts were assigned to either accreditation level 1, level 2, or level 3 by the discriminant analysis. No school districts were assigned to accreditation level 5. Based on the discriminant analysis of the seven financial indicator variables, 38 (25%) of the 149

school districts were classified in accreditation levels different from those assigned by the State Department of Education (see Table 13).

Table 13

Stepwise Discriminant Analysis: Classification Results of Accreditation Levels Using Variables in the Financial Indicators Category

		Predicted level membership and percent			
Assigned level	n	1	2	3	5
1	14	1 7.1%	6 42.9%	7 50.0%	0 0.0%
2	34	2 5.9%	15 44.1%	17 50.0%	0 0.0%
3	99	0 0.0%	4 4.0%	95 96.9%	0 0.0%
5[a]	2	0 0.0%	0 0.0%	2 100.0%	0 0.0%

Note. Approximately 75% of the districts were classified by discriminant analysis in the same levels as was assigned by the State Department of Education.
[a]No accreditation level 4 was assigned to any school district in the 1993 Mississippi Report Card.

Summary: Accreditation Outcome Measures

Discriminant analysis was used to determine which accreditation outcome measures were important in classifying

school districts into one of four accreditation levels. The school districts classified in particular accreditation levels determined by the discriminant analysis were then compared to the school districts in accreditation levels assigned by the state Department of Education.

The discriminating accreditation outcome measures that were defined by the discriminant analysis to classify school districts within one of four accreditation levels were the Stanford Achievement Test composite mean scores, state Algebra I mean scores, and Functional Literacy Exam composite mean scores. Table 13 presents two variables that met the minimum Wilks' Lambda criteria as discriminating variables defining the discriminant functions.

Table 13

Stepwise Discriminant Analysis for Accreditation Levels: Wilks' Lambda of Accreditation Outcome Measures

	Variables in the equation		
Step	Variable entered	Wilks' Lambda	prob.
1	SAT composite score	.602	.000*
2	State Algebra I test	.502	.000*

*$p < .05$

As presented in table 14, the discriminant analysis procedure, using the accreditation outcome measures, classified approximately 25% (n=36) of the school districts in the accreditation levels different from the accreditation levels assigned to school districts by the State Department of Education. More specifically, none of the school districts assigned to accreditation level 1 and level 5 by the State Department of Education were classified in accreditation level 1 or level 5 by the discriminant analysis. All 149 school districts were classified in either accreditation level 2 or level 3 by discriminant analysis.

Table 14

Stepwise Discriminant Analysis: Classification Results of Accreditation Levels Using Variables in the Accreditation Outcome Measures Category

		Predicted level membership and percent			
Assigned level	n	1	2	3	5
1	14	0 0.0%	12 85.7%	2 14.3%	0 0.0%
2	34	0 0.0%	20 58.8%	14 41.2%	0 0.0%
3	99	0 0.0%	6 6.1%	93 93.9%	0 0.0%
5[a]	2	0 0.0%	0 0.0%	2 100.0%	0 0.0%

Note. Approximately 75% of the districts were classified by discriminant analysis in the same levels as was assigned by the State Department of Education.

[a]No accreditation level 4 was assigned to any school district in the 1993 Mississippi Report Card.

Conclusions and Recommendations

Research Objective 1

According to the descriptive profiles of school districts using the 16 student and school indicator variables, it can be concluded that school districts assigned to accreditation levels 1 and 2 by the State Department of Education were descriptively similar to one another regarding most of the Report Card indicator variable values. In addition, it can be concluded that these similar school districts assigned to levels 1 and 2 were descriptively different from the school districts assigned to accreditation level 3 regarding descriptions of most of the indicator variables. No school districts were assigned to accreditation level 4 and only two school districts were assigned to level 5. For practical purposes, the conclusions drawn from this study mostly relate to school districts in accreditation levels 1, 2, and 3 since 99% of Mississippi's 149 school districts were assigned to these three accreditation levels.

Accreditation levels 1 and 2 school districts have smaller total populations, higher percentages of the black

population, lower percentages of the population with high school diplomas, and lower percentages of the population with 4/+ years of college compared with school districts in accreditation levels 3 and 5. It can be concluded that the accreditation levels 1 and 2 school districts have lower per capita incomes, higher percentages of families in the population below the poverty level, lower student enrollments, and higher percentages of the students eligible for free lunch than the school districts assigned to accreditation level 3. On the other hand, classroom pupil/teacher ratios were the same in school districts across accreditation levels 1, 2, and 3. The Percent of the students eligible for free lunch was higher in accreditation levels 1 and 2 school districts than in level 3 school districts.

It can also be concluded that graduation rates, percentage of teachers with advanced degrees, and emergency certificates as a percentage of the total number of teachers were different for school districts across accreditation levels 1, 2, and 3. Graduation rates were higher for school districts in levels 1 and 3 than for school districts in level 2. Percentage of teachers with advanced degrees

increased as accreditation levels increased from level 1 to level 3. Emergency certificates as a percentage of the total number of teachers decreased as accreditation levels increased from level 1 to level 3.

According to the descriptive profiles using the financial indicator variables, it can be concluded that school districts assigned to accreditation levels 1 and 2 were financially comparable to one another. Again, the school districts in these two levels were financially different from the school districts assigned to accreditation level 3. It was concluded that level 1 and 2 school districts had higher per pupil expenditures, percentage of expenditure for district administration, and per pupil expenditure for instruction than school districts assigned to accreditation level 3. It can also be concluded that accreditation level 1 and 2 school districts had lower per pupil expenditures for instruction excluding Chapter 1 funds, per pupil revenues for extracurricular activities, and per pupil expenditures for extracurricular activities than school districts assigned to accreditation level 3. It can also be concluded that assessed valuations per pupil were financially different for school districts across

accreditation levels 1, 2, and 3. Assessed valuation per pupil generally increased as accreditation levels increased from level 1 to level 3.

The conclusions from the descriptive analysis of school districts using the accreditation outcome measures support the earlier conclusions, based on student and school indicators, that school districts assigned to accreditation levels 1 and 2 are similar. Functional Literacy Exam (FLE) scores, Stanford Achievement Test scores, and state Algebra I scores were comparable for school districts in these two accreditation levels. It can also be concluded, based on the descriptive profiles using accreditation outcome measures, that these test scores were lower for school districts in accreditation levels 1 and 2 than for school districts in accreditation level 3.

In summary, there was little descriptive difference between school districts in accreditation levels 1 and 2 using the three categories of Mississippi Report Card indicators. In addition, it can be concluded that these school districts were descriptively different from the school districts assigned to accreditation level 3. All but two of the 149 school districts were assigned to

accreditation levels 1, 2, or 3 by the Mississippi State Department of Education. Two other school districts were assigned to accreditation level 5, and none were assigned to level 4.

Research Objective 2

Stepwise multiple regression analyses were performed to determine which Report Card indicator variables in each of two categories accounted for variations in the accreditation outcome measures. These two indicator variable categories were: (a) student and school indicator variables, and (b) financial indicator variables. The indicator variables in these two categories were used as independent variables to determine the amount of variation in the accreditation outcome measures that was associated with variation in the independent variables. The accreditation outcome measures were mean score values of the Functional Literacy Exam (FLE), the Stanford Achievement Test, and the state Algebra I test and were the dependent variables in the regression analyses. For clarification purposes, the accreditation outcome measure mean values were referred to as <u>test scores</u> in the following section of the narrative. The regression

analyses were conducted for all school districts combined and for school districts assigned to accreditation levels 1, 2, and 3, separately. When using and student and school indicators as the predictor variables, it can be concluded from the findings of this study that the percentages of the families below the poverty level, classroom pupil/teacher ratios, percentages of the students eligible for free lunch, and graduation rates were the significant indicator variables that accounted for variation in test scores for all school districts combined. It can be concluded that, for all school districts combined, higher classroom pupil/teacher ratios and higher graduation rates were significant predictors of higher test scores. Further, it can be concluded that higher percentages of families below the poverty level and higher percentages of the students eligible for free lunch were significant predictors of lower test scores for all school districts combined. It can also be concluded from the findings for the school districts in accreditation level 1 that higher percentages of the population with high school diplomas, fewer emergency certificates as a percent of the total number of teachers in the districts, a higher number of Carnegie units taught, and

higher graduation rates were significant predictors of higher test scores. In addition, for school districts in accreditation level 2, higher pupil/teacher ratios and higher graduation rates were found to be significant predictors of higher test scores. Finally, it can be concluded that lower percentages of the students eligible for free lunch, lower numbers of Carnegie units taught, and higher numbers of teachers with advanced degrees were significant predictors of higher test scores for school districts in accreditation level 3.

When financial indicator variables were used as the independent variables, larger assessed valuations per pupil, lower per pupil expenditures for district administration, lower per pupil expenditure for instruction, and higher per pupil expenditures for instruction excluding Chapter 1 funds were significant predictors of higher test scores for school districts across accreditation levels 1 through 3. For school districts assigned to accreditation level 1, it can be concluded that higher per pupil expenditures and lower per pupil expenditures for instruction excluding Chapter 1 funds were significant predictors of lower FLE scores. There were no other financial indicator variables that accounted

for variation in either SAT scores or state Algebra I scores for school districts assigned to accreditation level 1.

It can be concluded that lower per pupil expenditures for instruction and higher per pupil expenditures for instruction excluding Chapter 1 funds predict higher FLE scores for school districts in both accreditation levels 2 and 3. In addition, it can be concluded that no other financial indicator variables accounted for variation in either SAT or state Algebra I test scores for school districts in accreditation levels 1, 2, or 3.

Research Objective 3

Multiple discriminant analyses were used to classify school districts in accreditation levels using indicators in the 1993 Mississippi Report Card (Mississippi State Department of Education, 1993). The school districts were grouped according to the accreditation levels assigned by the State Department of Education. Discriminant analysis was performed to determine the classification of school districts into either accreditation levels 1, 2, 3, or 5 based on the three categories of Mississippi Report Card indicators. These three categories were: (a) student and

school indicator variables, (b) financial indicator variables, and (c) accreditation outcome measures. Discriminant analysis classified the school districts based on accreditation levels already assigned by the State Department of Education. This is a required procedure in the discriminant analysis equation process.

It can be concluded from the findings resulting from the discriminant analysis, using student and school indicator variables, that the percentage of the students eligible for free lunch was the best discriminating variable to classify school districts to specific accreditation levels. All 149 school districts were classified in either level 2 or level 3. It can be concluded that school districts were classified into accreditation levels differently by discriminant analysis, when compared to the accreditation levels assigned to school districts by the State Department of Education.

Using the seven financial indicator variables in the discriminant analysis to classify school districts in accreditation levels, it can be concluded that the percentage of expenditures for district administration, per pupil expenditures for instruction not including Chapter 1

funds, and per pupil expenditures were the discriminating variables that best assigned school districts to specific accreditation levels. The discriminant analysis using the financial indicator variables generated approximately the same classification results as the discriminant analysis of the student and school indicator variables. All but three of the 149 school districts were classified by discriminant analysis in accreditation levels 2 and 3. Three school districts were placed into level 1 and no school districts were placed into accreditation level 5. These findings imply that the school districts placed into accreditation levels 1 and 2 by the State Department of Education were to school districts placed into accreditation levels 2 and 3 by the discriminant analysis using the Report Card indicators. This conclusion is consistent with the conclusions drawn from the descriptive profiles and the correlation analysis cited earlier in this chapter. The conclusions from the findings that emerged in addressing research questions 1 through 4 were also supported by the results of the discriminant analysis using the accreditation outcome measures.

Based on the findings resulting from the discriminant analysis of accreditation outcome measures, it can be

concluded that the Functional Literacy Exam scores, Stanford Achievement Test scores, and the state Algebra I test scores were discriminating variables that placed school districts into specific accreditation levels. This finding was anticipated since accreditation outcome measures presented in the 1993 Mississippi Report Card (Mississippi State Department of Education, 1993) were used, in part, to place school districts into accreditation levels by the State Department of Education. However, the discriminant analysis classified all 149 school districts in either accreditation level 2 or level 3. No school districts were assigned to level 1 or level 5.

In summary, it can be concluded that approximately 25% of the school districts placed into accreditation levels 1, 2, and 3 by the State Department of Education were placed differently when compared to school district accreditation placement using the discriminant analysis of Report Card indicator variables. More specifically, the discriminant analysis placed all school districts into either accreditation levels 2 or 3 in each separate analysis using student and school indicator variables, financial indicator variables, and accreditation outcome measures.

It can also be concluded that the Report Card, in its present format, does not discriminate well in assigning school districts into accreditation levels 1 through 5 based on the systematic examination of the 37 indicator variables in this study.

The link between school district accreditation levels and the 1993 Mississippi Report Card indicator variables is tenuous. Only six of the 37 indicator variables examined in this study were significant discriminating variables that placed school districts into accreditation levels using the discriminant analysis. The accreditation system, as presented in the 1993 Mississippi Report Card, does not discriminate school districts into accreditation levels 4 or 5. Given the tenuous link between the accreditation levels and the Report Card indicator variables, the accreditation system and the Report Card format needs some re-thinking or re-examination regarding the implied theory of school district accreditation.

Recommendations

Based on the findings of this study using descriptive profiles of 1993 Mississippi Report Card indicator

variables, specifically related to research objective 1, it can be determined that school districts in accreditation levels 1 and 2 were comparable. It is recommended that a study be conducted to determine if variables that describe similar school districts should be used by educators and policymakers to determine school district accreditation status or assign school districts to accreditation levels based on school district similarities in future Report Cards.

It is also recommended that Report Card indicator variables not included as predictors of variation in accreditation outcome measures in the multiple regression analysis, specifically related to research objective 2, should be included in future studies to help determine the unexplained variation in the accreditation outcome measures. Additionally, the study should attempt to identify other indicators not included in the Report Card to help account for unexplained variation in the accreditation outcome measures.

The findings indicated that the use of the additional financial indicator variables, not included in the Report Card, provided valuable information about school district

accreditation status using discriminant analysis, specifically for research objective 3. These additional financial variables were significant predictors of accreditation outcome measures in the multiple regression analysis. It can be recommended that studies be conducted to determine how additional financial variables such as school district transportation funding and free lunch funding impact school district accreditation level ratings and accreditation outcome measures.

Finally, it can be recommended that the remaining indicator variables presented in the Mississippi Report Card, not analyzed in this study, should be studied to determine the relationships they have, if any, with school district accreditation status.

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